

Quarterly Report
January-March 1992

Yoram J. Kaufman
Goddard Space Flight Center
Greenbelt, MD 20771

- I. Near-term Objectives
 - a. Development of methods for remote sensing of aerosol from space as a basis for MODIS algorithms.
 - b. Assessment of procedures for atmospheric corrections. c. Generation of a data base for test and simulation of algorithms for remote sensing of aerosol and water vapor from MODIS and for atmospheric corrections.
- II. Task Progress
 - a. Remote sensing of water vapor from MODIS. The paper: "REMOTE SENSING OF WATER VAPOR IN THE NEAR IR FROM EOS/MODIS by Yoram Kaufman and Bo-Cai Gao was revised and accepted for publication in IEEE. b. Review of MODIS atmospheric algorithms. The following paper was published by the MODIS atmospheric group: M.D. King, Y.J. Kaufman, P. Menzel and D. Tanre, 1992: 'Determination of cloud, aerosol and water vapor properties from the Moderate Resolution Imaging Spectrometer (MODIS), IEEE J. Geosc. and Rem. Sens. 30, 2-27.
 - c. Remote sensing of the interaction of aerosol particles with clouds. The following paper was revised for publication:

Kaufman, Y. J. and Nakajima, T., 1992: 'Effect of Amazon smoke on cloud microphysics and albedo', accepted to J. Appl. Meteor, Squires special issue.
 - d. Measurements of the relation between aerosol properties and the radiation field

In remote sensing, and in the algorithms that we anticipate to prepare for the analysis of MODIS data, there is an inherent assumption that we are able to model the radiative transfer properties of the aerosol particles using some basic assumptions (spherical homogeneous particles) and MIE and radiative transfer

theory. Measurements of the actual relations between the aerosol optical thickness and the path radiance affected by the aerosol optical properties were conducted during 3 years in 40 locations over the world and summarized in a paper recently submitted for publication:

Y.J. Kaufman, 1992: 'Measurements of the aerosol optical thickness and the path radiance - implications on aerosol remote sensing and atmospheric corrections', IGARSS, MAY 1990, submitted to JGR-Atmospheres.

These relations can serve as a basis for evaluation of the accuracy of the models and if necessary for empirical corrections to the models to account for the actual aerosol properties.

e. The utility of composite in reducing the atmospheric effects.

A theoretical study was performed, using measured aerosol and surface reflectance properties to assess the reduction in the effective aerosol optical thickness using the composite technique used to derive the vegetation index. An extended abstract was written and a paper was accepted for an oral presentation in the IGARSS-92 meeting:

ATMOSPHERIC EFFECTS ON THE NDVI - STRATEGIES FOR ITS REMOVAL Y.J. Kaufman, D. Tanre, B. N. Holben, B. Markham and A. Gitelson

f. Field experiment

A field experiment is planned for the first two weeks of May in a desert transitions zone in Israel, with Brent Holben and Lorraine Remer from GSFC, W. Lazenby from GSFC/Wallops and several Israeli investigators. The experiment that is covered by an international agreement is designed to measure the spectral properties of soils and vegetation in a desert transition zone and the effect of dust on remote sensing of the properties. The reflectances are measured using quantitative photography technique from an airplane under and above the dust layer during cloud free conditions. Simultaneous measurements of the aerosol properties will be performed from the ground. The data set from this experiment will be used to test MODIS algorithms over a desert transition zone in the presence of dust. Analysis of a similar preliminary field experiment conducted in the Wallops area is under progress.

III. Anticipated Activities During the Next Quarter

a. Brazil Biomass Burning Experiment

Mike King and I are organizing a 1 day workshop at Goddard on May 20 involving the key participants in a MODIS land/atmosphere supported Brazil experiment. We have had several discussions already with key NASA Headquarters program managers (Janetos, Suttles, Wickland) on this subject.

b. Field experiment in Israel and analysis of field measurements

c. Participation in IGARSS-92 meeting

d. Participation in a meeting in NCAR in the end of June regarding a possible field experiment in MONGOLIA.

IV. Problems/Corrective Actions

No problems that we are aware of at this time.